Oxygen Delivery

REFERENCE

GOALS & PRINCIPLES

- Masks deliver supplemental O2 at higher flow rates and greater FiO2 than nasal cannula
- Give the minimum necessary to achieve the goal
- Goal SpO2 ≥94% in most people; 88–92% if at risk for hypercarbic respiratory failure
- Delivered oxygen is approximate — depends on inspiratory effort and face seal
- Faster inspiratory flow and looser seal both entrain more ambient air
- Higher flow rates can rapidly deplete portable O2 tanks

DEVICES

- Conventional nasal cannula (CNC): flow 1–6 LPM, FiO2 24–45%
- Ball-float flowmeter sets the flow rate — read the center of the ball
- Non-rebreather (NRB): flow 10–15 LPM, FiO2 ~80%
- NRB one-way valves permit exhalation but maintain higher FiO2
- NRB: ambient air blocked from entering (keeps FiO2 higher); CO2 exhaled freely, avoiding rebreathing
- Danger: NRB is hazardous if the O2 supply is exhausted or interrupted

TANK DURATION

Duration = Conversion Factor × Remaining Tank Pressure (PSI) ÷ Continuous Flow Rate (LPM)

Conversion factors: D tank = 0.16; M tank = 1.56

Vent patients: continuous flow rate = vT × RR

O2 tank regulator delivers the specified flow only if the tank has sufficient pressure

WORKED EXAMPLES

- Case 1 (EMT Jon, 2-hour transport, 6 LPM): main tank 1800 PSI → 468 min (7.8 hrs)
- Case 1: two D tanks, 2000 PSI → 520 min (8.6 hrs); about 16.4 hours total — enough
- Case 2 (vent patient, 6 ft): vT 466 × RR 12 = 5,592, or 5.592 LPM continuous flow
- Case 2 at 5.6 LPM: 1800 PSI → 501 min (8.35 hrs); 2000 PSI → 557 min (9.28 hrs)
- Case 2: about 17.5 hours total at a constant 5.6 LPM — enough for the transport

Take Home Message:

Give the minimum oxygen that hits the SpO2 goal — and calculate tank duration before a long transport, not during it.